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Bonding agents on acrylate resin basis and their use to anchorings reactive resin masses as sticking and bonding agents on the basis of insatiated polyester resins or of PU and/or of their education partners are for a long time known. Regularly it concerns two-component systems, whereby one.

Component reactive resin and/or some reaction partner and the other component the hardener and/or. the others < RTI ID=1.1> Rh. AC-< /RTI> more tionspartner contains. Others, usual constituents, like Füllmittel, accelerator, stabilisers, solvents including reactive solvents, dyes and such a thing can be into and/or other component a contained. By mixing the two components then the reaction under formation of a cured product becomes on brought. To the fixture of mooring rings in Boreholes generally cartridges used with two chambers to the separation of the components contained in the cartridge. The cartridge will will become into the Borehole used and by revolving bringing of the mooring ring into the Boreholes the cartridge and the chambers destroyed and the two components mixed. The cured reaction resin mass is able to make straddling pressure free the load introduction possible into the ground. Before all things for heavy load anchorages such shear connectors in the past preserved have themselves.

Meanwhile adhesive, insatiated polyester resin systems e.g. point to basis from < RTI ID=2.1> o-< /RTI> and/or isophthalic acid, mark in and/or fumaric acid as dicarboxylic acid and Dialkoholen with the risen requirements at adhesion strength and/or to the attachments certain weakness up. Like that these systems borders are in the thermostability (WFB after Martens 50 - 700C) as well as in the resistance to aging, in particular with influence of humidity, temperature changes and alkalinity set.

PU systems on the other hand react to sensitive with secondary reactions in presence of humidity. Beside the normally running reaction between polyole and isocyanate a competition reaction with the water occurs. Since isocyanate reaction with higher rate runs off the waters, in addition a portion of isocyanate under CO<sub>2</sub>-Bildung for the PU formation is lost in uncontrolled way, troubles are in the structure the inevitable succession.

Object of the present invention is it to make adhesive means available which free is from the known drawbacks and beyond that makes further advantages accessible, how they are following in exemplary way discussed.

Inventive one becomes this achieved with radical hardenable sticking, detention and sealant on acrylate basis, those inventive bisphenol and/or Novolak connections available reaction products contained exhibiting as hardenable acrylate by conversion of acrylic acid derivatives with Epoxigruppen.

The invention is the basis the realization that by the aforementioned conversion available monomers or oligomeren, reactive connections particular advantages make accessible. Know mono, in particular however diepoxides of diphenylmethanes or oligomeren Polybenzylderivaten, thus from connections, how they are represented for example by connections of the type of the bisphenol or novolac, when the one reaction component is used.

Preferred ones are here derivatives of bisphenol A or F and of Novolak connections, in particular with a content of group of benzyles from 3 to 8. As acrylic acid derivatives connections can be used, some free < RTI ID=3.1> carbonic acid < /RTI> group or, a functional carboxylic acid derivative contained reactive with Epoxiden. Preferred one is acrylic acid and Methacrylsäurederivate and acid derivatives of these two connections like e.g. esters, amides or halides, in particular the chlorides and the derivatives of such connections like e.g. - halogenous or others - the lowalkyl substituted derivatives. The esters are preferably the esters with aliphatic, especially < RTI ID=3.2> C1-C5-aliphatischen< /RTI> Alcohols in addition, with phenols and cyclohexanols.

Particularly preserved have itself reaction products, which by conversion of acrylic acid and/or their derivatives with such bisphenols, which are 2 Epoxigruppen and/or such novolacs, which have a Epoxigruppe per phenol core, available.

Preferably the Epoxireste is connected with the bisphenols and/or novolacs by an ether connection, even if direct CC linkage is not excluded. The ether bridge attacks the Epoxiverbindungen at the phenol core, dh is in particular directly connected under Verätherung of the phenolic OH-groups with the phenol core.

The Epoxigruppen is preferably Epoxialkylreste, which <, e.g. over; RTI ID=3.3> Ether bridges, < /RTI> if necessary in addition, in other way are connected with the bisphenols and/or novolacs.

This Epoxialkylgruppen points e.g. 2 - 5, preferably 3 - 4 Carbons, usually straight-chain up. Particularly preferred is such Epoxi bisphenols and/or Epoxi novolacs, is terminal with which then the Epoxigruppe. Als sehr gut geeignete Beispiele hierfür werden Bispropoxi-Bisphenole und Monopropoxi-Novolake mit endständigen Epoxigruppen genannt, wobei die Propoxigruppe jeweils mit dem Kern direkt über eine < RTI ID=4.1> Aethersauerstoffbrücke</RTI> is connected.

The Epoxiacrylatherze contained in the inventive sticking, detention and sealants < preferably a molecular weight of under 1500, in particular under 1200, although higher molecular weights, e.g. until 2000 or; RTI ID=4.2> darüber< /RTI> excluded are not. The reactive resins contained in the inventive means can by in fig. 1 and fig. 2

represented prototypes explained become. Their production can for example in from fig. 3 apparent way take place.

Particularly preserved has itself from the type of bisphenol of derived reactive resins of the kind in speech, which < also in the mixture also of; RTI ID=4.3> Novolak Typen< /RTI> derived reactive resins that it local ores kind contained to be here can, whereby the content can amount to on from Novolak types derived reactive resins preferably up to 60% and in particular up to 30%, related to the overall weight from the two aforementioned reactive resins.

As hardeners for the radical hardenable reactive resins initiators know such as Diarylperoxide, e.g. Dibenzoylperoxid (BP) or to (4-Chlorbenzoyl) peroxide (CLBP), Ketonperoxide, e.g. Methylmethyketonperoxid (MEKP) or Cyclohexanonperoxid (CHP), alkyl by esters, e.g. t-Butyl-perbenzoat (TBPB) and such contained to be. They are in usual quantities, e.g. between 0,5 to 5 Gew. - %, related to the total weight, contained.

The initiators can become phlegmatisiert in pure form (e.g. TBPB) or (e.g. with gypsum, chalk, Phthalat, chlorinated paraffin, water) as powders, emulsion or paste used. Further aggregates can be such as fillers contained. When strengthening fillers serve e.g. quartz, glass, corundum, porcelain, stoneware, Schwerspat, chalk, whereby fillers in the form of Sanden, flours or special < RTI ID=5.1> Formkdrpern< /RTI> (Cylinder, balls etc.) either the resin solution and/or the hardener (initiator) to be added can.

The bisphenol A acrylates and - methacrylate as well as the bisphenol F acrylates and - methacrylate have for example molecular weights within the range of 450 to scarcely 800, while the Novolakacrylate and - methacrylate, in depending on the number of the phenol cores, e.g. three to eight of the Ausgangsnovolakepoxids, molecular weights of for example within the range of 780 to 2000 to have been able.

< RTI ID=5.2> Reaktivverdtinner< /RTI> are not compellingly required. They can be used however simultaneous for the engagement of the desired viscosity. As < RTI ID=5.3> Reaktivverdunner< /RTI> can then the for this known connections, for example monostyrene, divinylbenzene, allyl ester more-basic acids, methacrylic acid ethyl esters, Methacrylsäure i more propylester, Methacrylsäure i more butylester and such a thing be used.

The resin solutions can be before-accelerated with accelerators, how them < for; RTI ID=5.4> cold-hardening, < /RTI> insatiated polyester resins are usual. As such accelerators can become for example Dimethylanilin, Diäthylanilin, Dimethyl p toluidin, Cobaltoctoat, Cobaltnaphthenat as well as cobalt/amine accelerator mixtures used.

The advantages of the inventive means lie first in the fact that, in particular good ages and < the positive characteristics of the more-full of seeds system; RTI ID=6.1> WitterungsbestEn < /RTI> into the means introduced become digkeit. In addition it comes that become positively affected by the content of hydroxyl groups the adhesion properties. It becomes a favourable wetting of glass, quartz, sand, rock and thus good detention characteristic achieved.

Contrary to cold-hardening Epoxiden, whose application borders are because of their temperature sensitivity with + 50C, the curing of the inventive radical hardening means with peroxides can be accomplished as with the unsaturated polyesters. Even with temperatures of for example - 100C is still another quick cure possible.

A further advantage lies in the fact that given regarding a smaller volume contraction at ester groups, essential opposite insatiated polyester resins, an high resistance is against alkaline saponification. Particular advantage lies however in it that the double bonds, in particular if they are terminal are particularly reactive there sterisch not hindered. Contrary to the double bonds with insatiated polyester resins, sterisch prevented because of their usual arrangement within the polyester chain, the inventive means react both to quick and practically quantitatively with its double bonds. Due to the preferred situation of the reactive group in the inventive means they are also capable therefore, without additive of < RTI ID=6.2> Reaktivverdunner< /RTI> to out-hard or other comonomers.

With use of the inventive means one receives a cured product, which opposite cured, insatiated polyester resins essential is tough-more elastic due to the cross-linking possibilities and a higher tear stretch exhibits. Due to the high < RTI ID=7.1> Reisidehnung< /RTI> the means are < in the situation, during; RTI ID=7.2> H8rtungverlaufs< /RTI> to take & top up the arising Volumenkontraktionen to a large extent without tension.

Particularly prefered < itself mixtures the subsequent Mi; RTI ID=7.3> schungsverhältnisse, < /RTI> related to the entire mixture, but without hardeners, proved:

Reactive resin 9 - 28 Gew. - < %; RTI ID=7.4> Reaktivverdunner< /RTI> 4 - 16 Gew. - %

Fillers 56 - 82 Gew. - % these mixture borders can for example with 5 < RTI ID=7.5> Gew. - t< /RTI> Hard component applied become. Together with the hardener and as < RTI ID=7.6> Härterbestandteil< /RTI> can Phlegmatisierungsmittel used become, both organic Phlegmatisierungsmittel and Phthalate, chlorinated paraffin and inorganic Phlegmatisierungsmittel such as gypsum, chalk, silicic acid or water.

Such Phlegmatisierungsmittel is in subordinated quantities, for example within the range of 0,5 to 3,5 Gew. - %, related to the entire mixture, contained, just as accelerator, those, if they are present, usually within the range of 0,005 to 2,0 Gew. - are present %, related to the entire mixture.

The use of the inventive means is particularly favourable to the fixture of dowels and mooring rings in Boreholes. Reaction resin and hardeners with the desired in each case constituents can become separate or into the Borehole introduced common immediately after mixing. Usually however reactive resin and hardeners in two chambers are separate contained for this purpose in a unit, e.g. in a cartridge. The cartridges or such units exist usually of glass or other easy destroyable material, including e.g. brittle plastic. The cartridge is then destroyed after bringing into the Borehole by inserting and turning of the dowel and/or the mooring ring, whereby the wall material can serve the cartridge as filler, and then the filler portions to add is. In addition, it is possible to use systems in those the one component, e.g. the hardener, microencapsulates is. When using the mooring ring the wall material of the microcapsules is then destroyed.

The high elongation of break that inventive used means an ensured to a large extent unstressed uptake of the Volumenkontraktion arising during the curing. With burden of the armature an extension of the mooring ring dependent of the borehole depth occurs. For inventive tough reading tables the means secure a more favorable load distribution essential opposite known shear connectors on basis of unsaturated polyesters on the entire group range and in particular

the degradation at the surface of the photograph material, for the example concrete, arising voltage peak-whole general lead the inventive means, which a mixture of acrylic acid modified bisphenol connections and acrylic acid modified novolac connections contained, to products with higher thermostability, which in particular with the use in the shear connector range, to the fixture of dowels and mooring rings in Boreholes of importance is. This results from from < RTI ID=8.1> Molekillstruktur< /RTI> resulting higher degree of crosslinking. This higher temperature resistance is simultaneous with a higher chemical resistance links a further advantage is the high weathering resistance and the small water uptake also with long-term contact with water.

The inventive means know known reaction resins, like insatiated polyester resins, Methylmethacrylatharze or other known epoxy resins in quantities in the sense of a modification of the characteristics contained, subordinated if necessary.

The epoxy bisphenols and/or - novolacs can e.g. become in usual manner by reaction of the bisphenol and/or novolac with epichlorohydrin manufactured (see. e.g. H.G. Elias, macromolecules, Basel, Heidelberg 1972, S. 707 - 709).

In the following embodiments the invention is more near explained.

Example 1 bisphenol A methacrylat 17,90 < RTI ID=9.1> Gew. - E< /RTI> (Mg: 492-775) Novolakmethacrylat 4,30 Gew. - < % ; RTI ID=9.2> (Mg: < /RTI> 780-1200) Monostyrene < RTI ID=9.3> 12,20 Gew. - E< /RTI> Divinylbenzene 1,00 Gew. - % silica sand 0.1? 0,25 mm of 30,00 Gew. - % silica sand 0.3? 0.65 < RTI ID=9.4> min< /RTI> 30,10 Gew. - % Dimethyl p toluidin 0,05 Gew. - % Dibenzoylperoxid 4,45 Gew. - % (50% industrial union < in chlorinated paraffin} ; RTI ID=9.5> 100,00 Gew. - %< /RTI> By mixing one keeps a mass < RTI ID=9.6> putty fähiger< /RTI> Consistency.

Gel time: 3 - 3.5 minutes of curing time: 35 minutes of strength: Mooring ring: M 12 setting depth: 110 mm of borehole diameters: 14 mm concrete: B 35, 1stfestigkeit 48N/mm<sup>2</sup> failure value: 74 kN eispiel 2 Dimension M 12 ) Aussenpatrone

Glass weight 5.6 g

Glass outside diameter 10,75 mm

Glass wall thickness 0,55 mm

Cartridge length 100 mm

bisphenol A methacrylat (65 < RTI ID=10.1> tig< /RTI> in monostyrene, amine-accelerated) 4.3 g

Quartz (particle size 1.5 - 2.0 mm) 6.6 g) interior cartridge

Glass weight 1.2 g

Glass outside diameter 6.30 mm

Glaswandstärke 0,65 mm

Cartridge length 80 mm

Dibenzoylperoxid (20% in gypsum) 0.8 g eispiel 3) outer cartridge

Glass weight 5.8 g

Glass outside diameter 9,20 mm

Glass wall thickness 0,45 mm

Cartridge length 90 mm

bisphenol A acrylate (55 < RTI ID=10.2> tig< /RTI> in monostyrene,

40 parts, Divinylbenzol 5 parts, beschleu nigt with 0,15%

Dimethyl-p-toluidin) 3,8 g b) Innenpatrone

Glasgewicht 2,2 g

Glass outside diameter 10,75 mm

Glass wall thickness 0,45 mm

Cartridge length 90 mm

Quartz (1.2 - 1.8 mm) 5.4 g

Dibenzoylperoxid (50% industrial union in Phtalat) 0.8 g example 4 A) outer cartridge

Glass weight 5.8 g

Glass outside diameter 10,75 mm

Glass wall thickness 0,45 mm

Cartridge length 110 mm

bisphenol A methacrylat (80% industrial union in methacrylic acid ester, before-accelerated also

Amine) 4.2 g b) interior cartridge

Glass weight 2.2 g

Glass outside diameter 9,20 mm

Glass wall thickness 0,45 mm

Cartridge length 90 mm

Quartz (0.04 - 0.15 mm) 0.4 g

Quartz (1.2 - 1.8 mm) 5.0 g

Dibenzoylperoxid (50% industrial union in chalk) 0.5 g Example ä) Outer cartridge

Glass weight 5.6 g

Glass outside diameter 10,75 mm

Glass wall thickness 0,45 mm

Cartridge length 100 mm

bisphenol A methacrylat

MG: 492 - 775 (75 < RTI ID=12.1> tig< /RTI> in monostyrene) 3.0 g

Novolakmethacrylat,

Mg: 780 - 1200 (60% industrial union in monostyrene) 1.2 g

Cobaltoctoat 0.001 g

Dimethylanilin 0.004 g b) interior cartridge

Glass weight 0.7 g

Glass outside diameter 43 mm

Glass wall thickness 0,65 mm

Patronenlänge 80 mm

Methylethylketonperoxid 0.35 g in the images 1 and 2 are in the inventive means contained reaction products in exemplary form explained. It concerns here preferable embodiments. The expiration to the formation of the reaction products is in image 3 in exemplary form schematically shown.